THE OPTICAL

MAGIC LANTERN

JOURNAL

AND

PHOTOGRAPHIC ENLARGER.

EDITED BY J. HAY TAYLOR.

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Notices.

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Notes.

THIS Journal, for the present month being a double number, the price is twopence; post-free for threepence.

* * *

WE have decided to introduce our readers from time to time to some of the Lantern and other manufactures, under the heading "Our Visits."

* * *

IT is expected that at the Crystal Palace Electrical Exhibition, to be held at the commencement of the New Year, various kinds of electric lamps for use in optical lanterns will be exhibited.

* * *

RUMOUR says that several of the large London publishers intend dealing in slides made from the illustrations of books which they publish, and that they are to sell them retail in sets, with a short printed description.

* * *

AT the Photographic Society of Great Britain the lantern nights continue to attract large audiences, and well they may, for the slides shown are of interesting subjects and of the highest class of workmanship.

* * *

THE seventh of the series of one-man exhibitions at the Camera Club began on 6th ult., and will remain open for about two months. The exhibition consists of photographs by Mr. Ralph W. Robinson, and include amongst others a complete set of his series of portraits of academicians.

* * *

A CORRESPONDENT complains of the readings which accompany the generality of slides. He says, "The only imperfect thing about lanterns now-a-days is the milk-and-water style of the readings. I feel assured that it is high time that we had the descriptions and stories written in a more lively strain."

* * *

AN adaptation for a lantern objective has been introduced by Messrs. Perkin, Son and Rayment, whereby a lantern slide may be projected upon a table. This method will be found very convenient for sketching, copying purposes, and also for examining slides. Our readers will doubtless find many other uses for this valuable adjunct.

* * *

The 4th inst. is the last day for sending lantern slides for the competition (open to the world) in connection with the Newcastle-on-Tyne and Northern Counties Photo Association. The only condition is that the work must not have been shown at any previous exhibition. Six slides only can be received from one exhibitor. These should be sent without delay to Mr. Edgar E. Lee (hon. secretary), 11, Beverley-terrace, Cullercoats, Newcastle-on-Tyne. Two silver medals have been placed at the disposal of the judges.

* * *

We have received from Miss Moore—whose advertisement appears in this issue—some fine gelatine etchings, copied direct without the aid of photography, both from sketches and reduced from nature. In the latter case the reduction is rendered by means of an instrument termed the philograph, which somewhat resembles a particular form of view-finder. Miss Moore, who is in every sense an artist, considers that this method lends itself to teaching drawing and perspective, and intends imparting particulars in a course of six lessons.

* * *

The aërial graphoscope is a new instrument for what is termed "showing lantern slides in the air." It consists of a strip of wood such as is used for making the slats of Venetian blinds; this is painted neutral tint and pivoted at its centre. The arms are rapidly revolved by suitable mechanism and lantern transparencies projected upon the screen which is thus formed by the persistence of vision.

* * *

If one were asked how to show gelatine or celluloid transparencies in a lantern, they would probably say place the gelatine between two glasses, and this is the method usually employed. Mr. Pumphrey has invented a new frame, which dispenses with the glass supports. The film is placed in a zinc mat, and the edges bent over it; as this, however, does not ensure its being flat, they are then placed in a stamping machine which indents a *half round*, which not only strengthens the rim, but also serves to stretch the films and render them flat and tight.

* * *

Instead of the papers on various subjects which were read at each meeting of the Lantern Society (20, Hanover-square, W.) last session, the Council propose to reduce the number of papers, and to have, once a month, an informal meeting, at which technical matters in connection with the lantern can be discussed. Members are invited to bring slides with them to these meetings for criticism or discussion, or for the instruction of others. Members are also requested to bring any pieces of apparatus with them for exhibition and discussion.

* * *

A short time ago Mr. G. Goodwin Norton gave a highly successful open-air lantern exhibition at Hythe. The disc was 20ft. in diameter, and the lantern was placed in a van 70ft. distant. As it was a moonlight night, it was necessary to turn the jets up to roaring point, but as a military band was also stationed in close proximity, the noise was not noticeable.

* * *

From reports received from various quarters we learn that Mr. Stock's new oil lamp is meeting with great appreciation by those who use it.

—:o:—

Zirconia.

Some little time ago, when in conversation with one of the Professors of a large London institution, he informed us that, for class work, he preferred zirconia to lime for the oxy-hydrogen light; and that, with the former, which was practically indestructible, it was possible (after an exhibition) to set the lantern apparatus away, say, on a shelf, for an unlimited period, and when the gas supply was connected and a light applied at the burner, it was possible to get a light of the same degree of intensity as was obtained at the previous time of using—that is, of course, presuming that the adjustment of the zirconia to the nipple had not been disturbed.

Now let us ascertain something about zirconia, which appears to be a valuable substitute for lime cylinders for producing the oxy-hydrogen light.

It is just a hundred years ago since the metal zirconium was discovered by Klaproth, in the mineral zircon, which is found in Ceylon, California, and certain parts of Ireland. It contains about thirty-three per cent. of silica, and the remaining parts of the earth are mixed with iron. Various methods have been employed for separating the zirconia. One method of removing the silica from the earth is by rendering the zircons red-hot, and then throwing the pieces into water, after which they can be readily powdered. When thoroughly dry, this powder is mixed with certain proportions of carbonate of soda and carbonate of potash, then heated until the mixture fuses, after which it is quickly cooled. The mass is then pulverised and treated with hydrochloric acid, which leaves the silica in an insoluble state. After this it is necessary to get rid of the iron from the zirconia. This may be done by taking the solution just mentioned and mixing with it carbonate of soda and hyposulphite of soda. After prolonged boiling, the iron is reduced to the state of protosalt and the zirconia precipitated. This precipitate is washed and dried, and is then ready for making up into cylinders, which is effected by compression.

Some years ago, patents for the preparation and compression of zirconia were obtained by M. Tessie du Mothay. In the specification he says: "Zirconia . . . can be agglomerated by compression into sticks, discs, cylinders, or other forms, suitable for being exposed to the flame of mixtures of oxygen and hydrogen without undergoing fusion or other alteration. Of all the known terrous oxides, it is the only one which remains unaltered when submitted to the action of the blow-pipe, fed by oxygen and hydrogen, or mixtures of oxygen with gaseous or liquid carbonated hydrogens. Zirconia is also, of all the terrous oxides, that which, when introduced into into an oxy-hydrogen flame, develops the most intense and the most fixed light. To obtain zirconia in a commercial state, I extract it from its native ores, by transforming, by the action of chlorine, in the presence of coal or charcoal, the silicate of zirconium, and of silicium. The chloride of silicium, which is more volatile than the chloride of ziconium, is separated from the latter by the action of heat; the chloride of zirconium remaining is afterwards converted to the state of oxide by any of the methods now used in chemistry. The zirconia thus obtained is first calcined, then moistened and submitted in moulds to the action of a press, with or without the intervention of agglutinant substances, such as borax, boracic acid, or clay. The sticks, cylinders, discs, or other forms thus agglomerated are thus brought to a high temperature, and thus receive a kind of tempering or preparing, the effect of which is to increase their density and molecular compactness. I can also compress in moulds, shaped for the purpose, a small quantity of zirconium capable of forming a cylinder or piece of little thickness, which may be united by compression in the same mould to other refractory earths, such as magnesia or clay."

During the early part of 1869 the Court of the Tuilleries was illuminated by the zirconia light on an extensive scale, by the Oxy-hydrogen Company, whose aim was to employ this light for illuminating buildings, cities, &c., and with such limited uses as optical lanterns, they did not concern themselves to any extent. Numerous experiments, however, were tried with this form of light for lantern purposes, the result of which may be summed up in a few words.

Compared with lime, the zirconia gave a light which was slightly reddish, whilst that from lime was of pearly appearance. The cost of a cylinder of zirconia is very great when contrasted with one of lime, but whilst the latter has a very short existence, the former is supposed to be practically indestructible. For class and other demonstrations, when the lantern may be required at a moment's notice, zirconia is particularly convenient, as the apparatus can be kept in readiness, so that all that is necessary is to turn on the gases and apply a light; but for general exhibitions, and particularly for long range, it cannot be said to supplant the lime as at present used. Moreover, it appears to be a difficult matter to obtain suitable pieces; for in zirconia there is, like in the majority of things—quality and quality.

TABLE for Ascertaining the Quantity of Gas in Cylinders from the Indication of Gauges showing Atmospheres.

ATMOSPHERES INDICATED ON GAUGE.	SIZES OF GAS BOTTLES.					
	6 Feet.	10 Feet.	12 Feet.	15 Feet.	20 Feet.	40 Feet.
20	1 Cubic Foot	1½ Cubic Feet	2 Cubic Feet	2½ Cubic Feet	3 Cubic Feet	6¼ Cubic Feet
40	2 Cubic Feet	3¼ " "	4 " "	5 " "	6¼ " "	12½ " "
60	3 " "	5 " "	6 " "	7½ " "	10 " "	20 " "
80	4 " "	6½ " "	8 " "	10 " "	12½ " "	25 " "
100	5 " "	8½ " "	10 " "	12½ " "	16¾ " "	33½ " "
120	6 " "	10 " "	12 " "	15 " "	20 " "	40 " "

Hand-Cameras for Obtaining Slides for the Lantern.

	"Facile"	(Fallowfield)	see	March 1st, 1890.
No. 1	"Giah"	(Mawson & Son)	,,	May 1st, ,,
,, 2	"Quadrant"	(W. H. Humphries & Co.)	,,	June 1st, ,,
,, 3	"Eclipse"	(J. F. Shew & Co.)	,,	July 1st, ,,
,, 4	"Eureka"	(W. W. Rouch & Co.)	,,	Aug. 1st, ,,
,, 5	"Key"	(Platinotype Co.)	,,	Sept. 1st, ,,
,, 6	"Optimus"	(Perken, Son & Rayment)	,,	Oct. 1st, ,,
,, 7	"The Griffin"	(Griffin & Sons, Limited)	,,	Nov. 1st, ,,
,, 8	"The Swinden-Earp" Patent		,,	Dec. 1st, ,,
,, 9	"Collins"	(C. G. Collins)	,,	Feb. 1st, 1891.
,, 10	"Kodak"	(Eastman Co.)	,,	Mar. 1st, ,,
,, 11	"Guinea"	(Walter Griffith)	,,	April 1st, ,,
,, 12	"Vanneck"	(Watson & Sons)	,,	May 1st, ,,
,, 13	"Chadwicks"	(W. I. Chadwick)	,,	June 1st, ,,
,, 14	"Bonanza"	(R. & A. J. Mercer)	,,	July 1st, ,,
,, 15	"Repeater"	(Cusworth)	,,	Aug. 1st, ,,
,, 16	"Marvel"	(Wilson & Son)	,,	Sept. 1st, ,,
,, 17	"Talmer"	(Talbot & Eamer)	,,	Oct. 1st, ,,

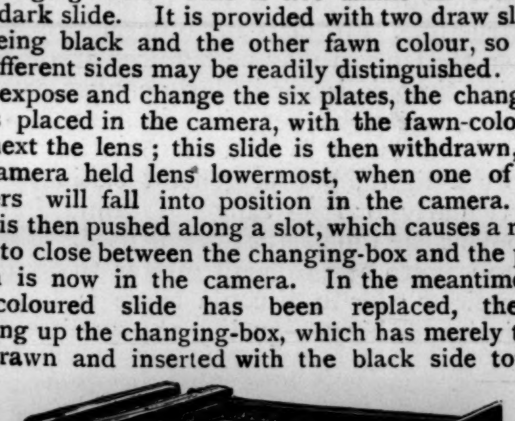
No. 18.—"THE OMNIGRAPH."

THE "Omnigraph," by Messrs. J. Lancaster and Son, cannot be included under the heading of a magazine camera, nor can it be considered as a camera having dark slides; it is provided with an excellent changing-box, capable of holding half-a-dozen quarter plates.

This changing-box sets into a well in the rear of camera-box, and is provided with three double metallic carriers, which are rims with an opaque division; they hinge open for the reception of two sensitive plates, these are placed back to back, the opaque division of the carrier separating them.

Each carrier, after being charged, is secured by a simple and efficient fastening, and placed inside of the changing back. This is not unlike an ordinary thick dark slide. It is provided with two draw slides, one being black and the other fawn colour, so that the different sides may be readily distinguished.

To expose and change the six plates, the changing-box is placed in the camera, with the fawn-coloured side next the lens; this slide is then withdrawn, and the camera held lens lowermost, when one of the carriers will fall into position in the camera. A knob is then pushed along a slot, which causes a roller blind to close between the changing-box and the plate which is now in the camera. In the meantime the light-coloured slide has been replaced, thereby shutting up the changing-box, which has merely to be withdrawn and inserted with the black side toward the lens, when the roller shutter is raised, the black slide pulled out, the camera tipped up, and the exposed plate thus removed from the focal plane. In like manner the six plates are changed and exposed



It should be remembered that when "feeding" into the camera it must always be done from the fawn-coloured side, and changed back again by the black side. In this way the six plates are presented in succession, first the three whose faces are lying towards the light side, then those which were lying towards the black slide, for each carrier is turned around in the process of changing.

The lens is single achromatic, and is provided with a shutter opening from the centre, which is termed the see-saw shutter. The accompanying cut will show its form. With it, it is possible to make either instantaneous or time exposures.

The camera is made in various materials according to prices, which range from 21s. to 25s. They measure 6 × 5½ × 4in., and weigh about 15oz. or 16oz. Extra changing-boxes, each to hold six plates, can be obtained. The changing of the plates is a very simple and short operation, full knowledge of which can be acquired with one or at most a couple of changes.

——:o:——

Our Visits.

No. I.—CHATHAM PEXTON.

FOR some time past it has been our intention to give our readers a few particulars of an occasional visit to some of the firms connected with the lantern business; and with this end in view, we called upon Mr. Chatham Pexton, who had invited us to inspect his new additional premises, which are situated at the corner of Gray's Inn-road and Holborn, London. Although the entrance is actually in Gray's Inn-road, it is known as 150, Holborn.

After mounting a flight of stairs, we found ourselves inside a main door which encloses the suite of rooms constituting the first floor.

Almost immediately on entering we find Mr. Pexton and some members of his staff hard at work. In course of conversation we inquired how it was that Mr. Pexton had come to embark in the business of slide painting, lanterns, &c. We gathered that, though originally intended for the Church, he did not feel that he had a *call* in that line, so he decided upon, and spent some years in the law.

Being tired of the dull monotony of the legal profession, he determined to travel, and eventually joined a theatrical company, and for twelve months appeared successfully on the stage. Many were the anecdotes and adventures he related to us. After a time he became home-sick, and decided to return once more to the parental roof, and after an absence of two years and a-half was welcomed back.

Being naturally of an artistic turn, he devoted considerable time to painting, which eventually took the form of painting on glass, and so the foundation of the present large business was laid.

Mr. Pexton certainly possesses great ability as a painter, and during our stay he operated on several pictures and showed us the various styles and qualities of colouring. He divided one slide into four sections, and painted each part a different way; thus giving us a good idea of how slides could be treated according to the prices paid for them. The cheap slides sold, he said, in no way affected the sale of the best work, for there was a rapid and increasing demand for really good things.

Mr. Pexton produces his slides by three different processes—the wet collodion, the albumen, and the dry plate; but he gives preference, however, to the first-named. All the artists in Mr. Pexton's employ have been carefully trained by him, and he claims to be one of the few in the trade who can practically conduct the business from beginning to end.

About twenty years ago he began business in Holloway, but as business grew he took extra premises in Gray's Inn-road, and he has now taken the additional rooms mentioned. Several thousands of very fine slides, both plain and coloured, were to be seen. We observed that Mr. Pexton makes a special point of inspecting and advising at each stage of the painting processes.

Going into the main show-room we find an array of very fine lantern apparatus, lenses, condensors, cylinders, and the hundred and one things which the lanternists of the present day employ.

The Holloway premises in Drayton Park are used for the photographic production of the slides and a portion of the painting business.

Next April, or early in May, Mr. Pexton leaves for America on a holiday tour, and intends to take with him a lantern, cylinders, and all the necessaries for a good exhibition, as he will give entertainments crossing the Atlantic; for he says he should not enjoy the voyage if he left his lantern and slides behind. Although we intended to stay only a short time with Mr. Pexton, we found we had spent over three hours in his company; but this we did not regret, for we had learned and seen much.

——:o:——

Hints and Helps.—No. 3.

By C. E. Rendle.

VARIOUS.

In dealing with platinum, in the September Journal, I was anxious in giving its market value—to speak as favourably as possible. For a long time a fall has been expected, so I really quoted it at 7s. 6d. an ounce less than the price it actually stood at. The first drop has taken place, and contrary to all expectation has proved a heavy one, viz.—25 per cent. to 30 per cent. So instead of being 60s., it can now be had at 45s. to 50s. per ounce. For ten or twelve years it has been gradually and steadily rising, being carefully nursed the while, by the syndicate whose business has been to run it up, and keep it up as long as circumstances would allow. Supply, however, has exceeded demand, and there can be little doubt that before long it will be down to the prices it stood at so long, 30s to 40s. This is a matter not likely to affect my readers at present, but once having broached a subject I feel desirous of keeping them posted in details relative to it; and, further, while readily acknowledging the rapid growth of the Optical Lantern during the past twenty seasons, think, without hesitation, there will remain for years and years to come a wide field for the further development and study of a subject so full of interest, science, and art.

The portable screen is again being discussed in these columns. I would advise all interested in this to refer back to page 75 of the present volume, and read of the capital and practical screen frame there described by Mr. Hilton Grumby. This is about the most useful and economical piece of apparatus any amateur or professional could wish for, and if we can decide upon a screen, like the frame, within everybody's reach, Mr. Altman's article will not have been written in vain.

Just at this time of the year, when all lanternists are contemplating some happy evenings during the Autumn and Winter sessions now commencing—and I am quite of opinion that the entertainer enjoys the show as much as those who come to be entertained—he should (no doubt does) overhaul his paraphernalia to see that everything is in working order, and correct any defects under notice. It not unfrequently happens that the bevil wheels of the jets stick, or do not work with the ease and accuracy he desires. After a little wear the pivot holes get large, giving too much play or shake, consequently they get bound together. The one working horizontally on the platform is generally the first to suffer. This can be greatly obviated in a few minutes without visiting the maker, presuming, of course, we possess a few ordinary tools. Drill a hole one-sixteenth of an inch in platform, about one-eighth of an inch clear of the wheel, tap the hole with a screwed tap of suitable size; now take a piece of steel or brass wire, and bend in centre to right angles, tap one end of this in screw-plate, and screw into hole until the bent-end nearly touches the wheel; any superfluous metal can be cut away, and the job is done. This acts as a guide, steadies the wheel, never need be removed, and has saved, to my knowledge, in two or three cases, time, temper, and the utterance of certain words not found in dictionaries.

——:o:——

Portable Opaque Screen.

By W. Sparrow (Eastbourne).

It is with great interest that I have observed the discussion that has now commenced in the columns of this Journal on the improvement of opaque screens from a portable point of view, for such will be a great boon to lanternists. Those who desire an opaque screen for home use only are not troubled on this score, for they can keep the screen on its roller, and it can be so placed as to be entirely out of the way when not in use. A very convenient position for this purpose is to hang the screen in the bay window of a room, leaving the roller at the bottom. A couple of pulleys at the top, and a cord partly wound around the ends of roller (which must be a little longer than the screen) enables it to be drawn up under the cornice of the curtains, *à la* theatrical curtain.

In the case of a lanternist who has occasion to take his outfit for some distance, matters are quite different, the chief stumbling-block being the roller up which the present form of opaque screen has to be wound.

I adopt a means of rendering my screen opaque that will doubtless be of interest to many. I use two screens—one being the usual white fabric used for the purpose, the other being of black material. These two screens are erected on the one frame, the black, of course, being placed behind; both must be quite close together and well strained on the frame. This method will be found to greatly enhance the brilliancy of the image projected upon the screen; but it is absolutely essential that the two screens be placed touching each other, else will the desired effect be entirely lost.

The addition of the black linen screen costs but a trifle, and the small outlay is amply compensated for by the increased brilliancy and vigour of the picture projected. Both screens may be tightly folded into small space, and are without any blemishes when stretched. I do not intend to say that this is all that can be desired in a portable opaque screen, but it certainly is a very great improvement on the plain white sheet.

:o:

New Patent Brass Curtain Shutter.

By G. S. Thompson.

The effect of a picture of a curtain on the screen rolling up and revealing another picture behind it as it rises, is so frequently used now, and is so popular, that I have devoted some time and trouble to devising an arrangement which shall give us this effect rather more efficiently than it is given by the curtain shutters generally fitted to lanterns, and without the disadvantages or complications which attend their use.

The method I employ is as follows:—

The lantern (bi-unial or triple) is fitted with a brass curtain shutter, working by rackwork, which is divided into two parts, the upper one being automatically stopped in descending when clear of the top lantern, while the rack carries the lower one clear of the bottom lantern. By this means the shutter is got entirely out of the way after use, and dissolving can be effected without removing the shutter from the lantern, or working any part of it with the other hand, the one rack handle manipulating the whole automatically.

Again, by the addition of an extra or third portion, which, when not in use, projects above the top lantern somewhat, as the ordinary rigid curtain shutters do, the following advantages can be obtained. Instead of being obliged—after a rolling-up effect with a bi-unial lantern—to have a rolling-down effect, two rolling-up or two rolling-down effects can be obtained in succession, and the concluding drop-scene can be introduced without any previous calculation. Thus, let it be assumed that a drop-curtain having fallen after a lecture, it is made to rise on a title or introduction scene, such as that of Jane Conquest; then, at the proper cue in the recitation, this title-scene also rises like a curtain, disclosing the heroine in "Her home by the sea." This second rolling-up effect is produced simply by the turning of the rack-handle in the same direction as before. By one more simple movement the top lantern is opened, and the bi-unial is free for dissolving, which may, of course, be continued at pleasure.

To produce a rolling-down effect at the end of the piece it is not at all necessary to calculate whether there be an odd or even number of slides to dissolve, as the effect can be produced at will from either lantern by simply reversing the manner of producing the rolling-up effect. If a rolling-down effect be first made, disclosing a scene from the top lantern, another can be made appearing from the bottom lantern, but it must be understood that it is not at all imperative to make two rolling-up effects in succession, but both optical systems are quite as simply open after one as after two.

With a triple lantern the action of the shutter is just as simple, and the manipulation identical with that of the bi-unial.

As I do not know of any other shutter combining all these advantages, I have patented my idea, and made arrangements for the manufacture of these shutters by Messrs. Newton, of Fleet Street, London, by whom they will shortly be introduced.

:o:

How I Became a Lanternist.—VIII.

By the Vice-President of the Lantern Society.

(*Continued from page 158.*)

Slide-Making.

Having in some of the recent issues suggested in the barest possible form, as a practical lanternist, the desirability of having things compact and extremely portable, in lantern and sheet in particular, I should like to turn to the next essential—that is, *slides*.

Now some say there is nothing so simple in photography as slide-making. There is nothing so simple as any difficult thing—if you know the way; but nothing is simple, I maintain, till you do know. Now just think of it. The average business men in London—and I am one of them—rise at 7.30 in the morning, or thereabouts. Living in a London terrace, and in a London house, the only available dark room is the bath-room, and where a large proportion of the household take their morning dip, one's morning's work is practically prohibited, especially in view of the fact that the candle cannot be burnt at both ends. Supposing a man works late, is at meetings late, has certain duties to perform at night, certain pleasures, or certain recreations, he cannot get up in the small hours and begin work of that kind. And if he did, he would do it under pressure which would be detrimental to the work itself. How can a man make lantern slides in the morning, and be busy until close on to midnight the night before? It simply cannot be done. It must be either the one or the other.

In this difficulty, after twelve months of incessant writing to many persons for help, I went into all the leading West End photographic establishments, and leaning over the counter with a sort of persistent politeness, asked, "Can you show me an apparatus for reducing negatives for lantern slides—one for artificial light for night-work?" I repeated it so often in letters to firms, and over their counters, that it had naturally become a stereotyped question. As all the world would know, I was met by a shake of the head in the first place by the person, who, then turning to a catalogue, had to declare there was no such thing. I was often told "There is nothing made; but it is quite simple. You can do it with your camera, or from So-and-So's 'multum in ——' something or the other; and there is So-and-So's reducing box." Well, now, in a rash moment I speculated in one of the boxes intended for the purpose. This is made of cardboard, with a couple of lids at one end and grooves at the other—a perfectly shoddy article in all its outer garnishment, but a perfect gem for the work it does. It is as far from perfect as possible; but for daylight produces results that nobody can question. All I had to learn was the exposure. My proceedings necessitated my going from my dark room up a short flight of steps—a sort of tread-mill operation. Thus in the dark room, my window protected, the door secured, my slide was inserted, and then I marched to the adjacent room up the said steps, or stairs, and exposed my plate seven minutes at the window, sitting down and fidgetting with my watch while it covered; then down I came, developed my plate, and the result (a little under-exposed, perhaps), but results very promising. But as the months went by, and the summer afforded no opportunity of working in daylight, it became a necessity for it to be an evening recreation. This resolve was arrived at by circumstances I could not control, and not by any mental bias of my own.

To arrive at a decision was something, but to work in accordance with it was another thing. Now, in the first place, I held the said box up to the ordinary gas-burner, as the makers said I could do, and from a variety of experiments, the details of which would be wearisome, I calculated that each plate would have taken, with ground glass, not less than twenty to thirty minutes' exposure to have produced a slide that would have been by no means too dense. I could not afford the time; so I tried a second experiment, and in this case I got a lead frame, in which I inserted four ordinary burners, and attached them to the gas-jet, and gave twelve minutes' exposure. Result, in spite of ground glass, uneven exposure, density opposite the four lights, and no density elsewhere. Arriving at the point of despair, I gave it up, locked up the apparatus, and gave up all thought of further experiments in that direction.

Finding myself needing slides which I was ambitious of making myself, I thought I would re-try with a reduction box, and on this occasion I turned on a magic lantern lighted with oil, placing the box a long way from the light, in order to get an even exposure; but as a matter of fact, the exposure necessary in this case was evidently so long and excessive, that even after twelve minutes, I could only get the faintest suggestion of a picture.

Then I thought of trying magnesium wire, and I burned, holding in an old pair of nail-shears a certain length a good distance away—say, a foot or fifteen inches. In this result I always got the centre of the slide well out, with about the right density; but the outer edges were phantom. Then I tried by moving the wire about rapidly as it burned; but I was still only little nearer an even exposure. Then I got a machine for burning the wire in front of the box. I burned more, and held it still farther away, with the hope of getting an even light; but the results were extremely unsatisfactory.

What seemed absolutely wanting was some mechanical arrangement, by which about three or four wires could be burned—say, about 9in. away from the ground glass—and each wire apart from the other a few inches. I found great difficulty, even with the turning apparatus, to keep the wire constantly alight, or to keep it burning at an even power of illumination. But be that as it may, it was an undoubted fact that I did not get one slide with a perfectly even illumination—one bit would be over-exposed, the rest a little under. And then I had to relegate to the oblivion of failure my last experiment in that line; and so for six months I placed the whole thing aside, determining never to waste my time, of which I have none to spare, but to give up slide-making, unless by contact-printing or daylight-reduction. How I ultimately found dry land in the sea of my troubles I will relate in the next concluding article of the series, and send on a few samples of work done for the Editor's inspection.

(To be concluded in our next.)

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Leach's Lantern Microscope.*

By W. I. Chadwick.

In lantern microscope projection, three things are essential—the first is brilliant illumination, the second large amplification, and the third clear display of detail. But brilliant illumination does not mean a dazzling display of light upon a large white screen, showing the dark patchy outline of an object without detail. Objects shown in this way are far inferior to enlarged woodcuts.

The light must be made to enter the object so as to present all the details of its structure to the eye of the observer; but no amount of light will bring out this detail if its dimensions are too small for the crystalline lens to form an image of it upon the retina.

With high power objectives the light on the screen must in the very nature of things be greatly subdued.

Still, a large image, moderately but properly lighted, can often be far better observed than a small one many times brighter. An object may, in fact, be too powerfully illuminated.

If rays of great angle are too powerfully converged upon an object, the image becomes almost as bright as the other parts of the screen which represent nothing but clear glass, and in this case the image appears "flat" and without contrast—like an over exposed photograph. The image may, therefore, be too bright for the screen or it may be too dark, and the best results are those obtained with the mean, showing all detail without destroying contrast.

A lantern microscope, to be of any satisfactory use, must define, for instance, such objects as *stellate hairs of deutsia*, the minute lace-like structure of *spine of echinus*, the matted structure of the *hairs of reindeer*, the *lancet of male flea*, its sucking tube, &c.; the *stomata of leaves* are very easy to show. *Foraminifera* of the smallest sizes should be exhibited to from 7in. to 10in. diameter, with all their varied beauty of form and shading. The *tongue of the bee* should have all its structure clearly displayed to audiences of three or four hundred people; for this purpose it must be magnified to above 20ft. long; then the bulb at the tip of the fleshy cone, should be shown with the hairs standing out from the trunk and circling round it, apparently marking off its various parts as if they were joined to each other in telescopic articulations; the muscles of the trunk and the apparently and no doubt really central air tube connected with the trachia ought all to be well-defined; and what has been said regarding these objects, applies equally to all kinds of animal and vegetable structure.

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* Read before the London Microscopical Society

It is not claimed for the lantern microscope that *every* object, however delicate, can be shown as perfectly as in the ordinary table microscope, or that photo-micrographs are henceforth unnecessary.

But it is, notwithstanding, absolutely certain that the lantern microscope now takes rank amongst the scientific instruments of the day, and can no more be dispensed with than the optical lantern itself.

It is claimed that by the *Leach Lantern Microscope*, all we have said can be done, and a very great deal more, though to say that *anybody* can do it perfectly on a first trial, would be as wild a statement as to say that *anybody* who buys a camera and lens can at once produce beautiful photographs, or to guarantee the man who buys a piano to be able to play it to the best advantage.

The Leach Microscope can be applied to any oxy-hydrogen lantern. It is screwed on the front, in place of the ordinary lantern objective, the size of flange required being 2½in.; when the lantern objective flange is larger than this, an adaptor must be provided; and when the draw tube of the lantern is ricketty a rigid lengthening tube may be adapted.

The lantern condenser should be about 4in. or 4½in. diameter, and of the triple form; ordinary lantern condensers are usually of the double form, then a third lens can be supplied for a few shillings.

The stage of the microscope is open at both sides, and also at the top, it serves for all classes of objects, whether ordinary microscopic slides, or polariscope crystals, shown with either narrow angle rays or by the convergent system of lenses.

The stage being so constructed, it is extremely accessible for the introduction of sub-condensors with which the instrument is provided, and permits, with the greatest convenience, the introduction and manipulation of the polarising prism, which latter may be entirely rotated, so that all the phenomena of polarised light may be exhibited to the greatest perfection.

The object-holder is quite a novel idea, the principal mechanism of it is placed under the stage (to be out of the way), two arms passing through slots in the bottom of the stage, actuated by a spring, and manipulated by a milled head, serve to hold the objects flat against the inside surface of the front of the stage.

The diaphragms, or compound wheel of diaphragms, and the mechanism in connection with it, is unique.

The wheel of diaphragms is rotative on a pivot attached to the plate-arm in such a manner that the whole may be raised out of the field altogether and dropped into it again in an instant, or just as required, and when the compound wheel of diaphragms is raised a spring-catch holds it in position, and prevents it dropping by its own weight.

When in this position the whole field of the microscope can be utilised for showing objects up to 1½in. in diameter; thus this compound wheel of the diaphragms of 2½in. in diameter yields just as large a field as can be obtained by one of the ordinary form of 5in. in diameter.

When, as in using polarised light, it is desired not to be incommoded with the diaphragms, the detachable plate carrying the compound wheel can be instantly removed from the stage, and when again required it can be as quickly restored.

The arms of the object-holder projecting through the bottom of the stage have sufficient lateral movement to admit any zoophite through or wooden frame, or combination of wooden frames, up to 1in. in thickness. Thus the advantages of this arrangement are clearly manifest.

The two sub-condensers with which the instrument is provided are found to give the utmost satisfaction with all objectives of from 2½in. to four-tenths of an inch focus, and the simplicity with which these sub-condensers are changed is another feature of novelty in the instrument. All that is necessary to make the change is to take out one and push the other in its place. Thus the exhibition or demonstration may proceed without a moment's delay, neither object, objective, or diaphragm being disturbed.

When the light has been properly concentrated, as is the case with Leach's Microscope, high powers can be used, and with ample illumination for showing all necessary detail, either for class-room instruction or lecture hall demonstrations.

It should also be observed that, when high powers are used, the front lens of the objective is open to the view of the manipulator, a great convenience when inserting the object, by enabling it to be immediately adjusted within the area of the lens, so that its image may at once be seen in the field without the tiresome "groping" for it, a method which is usually resorted to with some lantern microscopes. The advantages of this arrangement will be at once apparent, especially when using, say, a one-twelfth inch or higher power for photo-micrography.

When polarised light is to be used, the polarising prism must be pushed into the rotating tube of the instrument by removing the concave lens at the back, and, after inserting the prism, this concave lens may be replaced in an instant.

To do this when ordinary lanterns are used, the usual draw-tube carrying the microscope must be removed for the purpose; but with a Chadwick optical lantern the microscope need not be disturbed; all that is necessary is to disconnect the bellows attached to the lantern front, and the back of the microscope is at once accessible for the removal of the concave lens, and insertion of the prism, &c., and this may be done in less time than it takes to describe the operation; thus the change from common to polarised light can be made in a few seconds.

The rotating tube will be found an immense advantage over fixed tubes, as the polarising prism can by this arrangement be placed in any desired azimuth, which best suits the object, the analyser, or the screen.

The convergent system of lenses for use with polarised light in transmitting rays through biaxial crystals, is a system of lenses worked out by Mr. Leach with great patience. It gives powerful illumination, and includes an angle of 170 deg. The front focussing arrangement was introduced by Mr. Leach in 1883. Before that time several supplementary lenses had to be kept in readiness for use, as different classes of crystals were placed in the polariscope.

Mr. Leach discovered how these supplementary lenses might be dispensed with, and fitted up his system accordingly; and now all makers of first-class polariscopes attach to their instruments this great improvement.

The concave field lens, with which the instrument is provided, is absolutely necessary when the polarising prism is in use. It is useful also with low powers when using common light. With all powers it enlarges the field, and equalises the distribution of illumination; but, when a small field only is desired, with the illumination in the centre, it may be used or dispensed with at pleasure.

The three objective adaptors with which the instrument is provided, admit of the use of any microscope power with the Standard screw. They are made to slide in the front tube of the microscope, which is provided with a rack and pinion, and also a fine screw movement, capable of the most delicate adjustment.

Thus, by having the various powers already screwed into the adaptors, one may be changed for another almost instantaneously. And into the front or tube portion of these adaptors the tube of the amplifier is made to slide.

Amplifiers usually supplied with lantern microscopes are simple uncorrected lenses, perfectly worthless for the purpose for which they are intended.

The amplifier with which Leach's Microscope is provided is a *Barlow* lens, and being achromatic, it not only does not destroy, but very much enhances, the aplanatic qualities of the objective, and is far superior to so-called "projection eye-pieces."

It has been inconsistently asserted by persons who ought to know better, "that high powers cannot be used in the lantern microscope, that it is unable to exhibit fine detail upon the screen, and that no alum trough is required." No doubt this is all true so far as applied to inefficient instruments and "jim-crank" arrangements. But the microscope now before us *does* require an alum trough, because where great light is concentrated from the oxy-hydrogen luminant, great heat must, from the very nature of the means employed, be concentrated with it, and the alum trough is the only practical thing which can be used to absorb the heat rays.

Of course, where there is no light there is no heat, and therefore no necessity for an alum trough, and instruments which do not require one are self-condemned.

The alum trough provided for the Leach Microscope is of large size, and is used in the ordinary slide stage of the lantern.

[At the conclusion of the paper, which was given before a large audience, a demonstration was given, showing by polarised and other light various objects on a 12ft. screen.]

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A Portable Screen for Small Rooms.

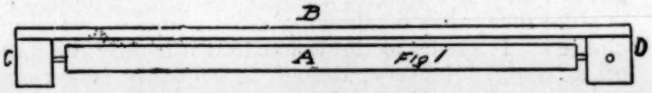
BY ALFRED WATKINS.

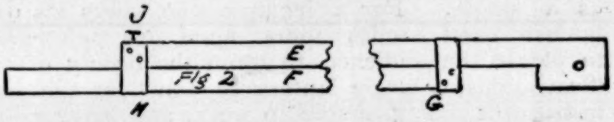
I AM afraid that a really portable opaque screen of large size, one which will fold up and not need a long roller, is still likely to be a missing want, and that the plan suggested last month of whitewashing the screen each time in the position in which it is fixed is not likely to be popular.

There is, however, no doubt that an opaque screen, paper-faced or otherwise, gives a much more brilliant light than the usual semi-transparent linen or cotton sheet.

Some years ago, I made a 6ft. paper-faced screen of original design, and have used it for a good many schoolroom lectures since. It is by far the most convenient thing of the kind I have seen, and possesses the following advantages: All parts are fastened together, there is not a loose piece in the whole affair; it can be put up wherever there is a wall to lean it against, and can be elevated as high as may be required, so that the bottom of the sheet may clear the heads of the audience. When packed, the packing forms a box to protect the rolled-up sheet; it can be unpacked and set up in one and a-half minutes, and when done with, packed up in one and three-quarter minutes (timed by watch). Its one disadvantage is that the length of package is a little over the width of the sheet.

Let me try to describe it: The screen itself (coarse linen faced with white paper), is fastened to a 1¼in. blind roller (A) fitted with that pattern of blind fittings in which the pulling of a single cord rolls up or unrolls the blind (or screen in this case). The roller pivots abut against two blocks of wood, each 2¾in. square (C and D) and these are screwed at the proper distance apart to a strip of wood (B) 2¾in. wide and ⅝in. thick. This strip of wood and end blocks form the foundation of the box or case which protects the rolled-up screen. The *sides* of the box are fastened at one end only by a single screw to the blocks, the one side to C, the other to D. These side pieces are therefore free to open out at right angles to the roller, and in fact form the uprights which support it when erected for use. In order that the top of the screen may be elevated to any desired height, the side pieces are each made in two pieces, sliding against each other (E and F in Fig 2); they are kept together by the bent brass hoops or plates encircling both strips, the one C being fastened to the strip F, and the other hoop H fastened to the strip E. The side pieces are ⅝in. thick and their united width 2¾in. The lathe fastened to the bottom of the screen is bare ½in. thick, and 3in. wide, and when rolled up forms the remaining side of the box. Two small straps, each secured by a screw to the top rail, fastens all together when packed, and the long blind-cord is wound round the whole and fastened off under a leather cleat.





The mode of erecting is to unfasten the straps and unwind the blind-cord, hold the whole case against the wall breast high, and let the ends of the side pieces fall to the ground, raise up top part until the side pieces support it, and then the telescopic extension of the side pieces may be brought into play and the top roller elevated to any desired height; a pin (J) securing the sliding parts at any position. The screen may now be let down like a blind by pulling the cord.

Fig 1 is a plan of the screen without the side pieces or bottom rail; Fig 2, a plan of one of the extending side pieces (shown partly extended). The length of the various parts is decided by the width of the sheet; 6ft. is the size of sheet I have made, but the same pattern could be made for an 8ft. screen, and possibly for a 10ft. one. Over that size this pattern would probably be unmanageable.

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Colouring Lantern Slides.—No. 5.

By A. W. Scott.

(Continued from page 154.)

Effects.—This title includes slides which are exhibited in pairs, or in sets of three, at the same time, by two or three lanterns, in order to produce pictorial displays which could not be shown by a single lantern. Some persons affect to despise the illusions so obtained, calling them childish and out of date. Indeed, one well-known dealer advertises a single lantern as "The Perfect Optical Lantern," although it is alike incapable of showing effects and of washing clothes. It seems to the writer that it is only the half of a perfect lantern, though it probably is perfect as a single. For a lecturer who works his own lantern, and relies more upon his eloquence to please the audience than on the beauty of the illustrations, a single lantern is doubtless the best instrument, being simple to work, and leaving him more at leisure to think of the subject of his discourse; but when the lecturer has a competent operator to assist him the case stands on a different footing.

There is no question that coloured slides of good quality—if their enlarged images are viewed at a proper distance in proportion to their size—are more interesting to the general public than a long run of uncoloured pictures. And there is no question that a few dioramic illusions, also of good quality, are equally pleasing to the onlookers, for the bulk of whom they probably have the attraction of novelty. A joke in a dry lecture comes like an oasis in the desert; a good lantern effect in a course of ordinary views is equally welcome.

The modern system of producing the limelight by means of compressed oxygen and a saturator is not, perhaps, so well adapted for use with a dissolving tap, especially in frosty weather, as the older method of using oxygen and coal-gas in gas-bags; the safest plan at present being to dispense with the dissolving tap, and using a couple of Y joints to keep both lights burning all the time; but as the increased consumption of oxygen is counterbalanced by the saving in coal-gas, and as benzoline is cheap and gives a better light than coal-gas, and is safe from "pops," if the jets are provided with pumice-packed mixing-chambers, it may be affirmed that, on the whole, dissolving views are as easy to produce now as formerly.

Providence has furnished us with two eyes, in order that we may enjoy the "effects" of stereoscopic vision, ability to estimate distances, and increased colour perception; with two feet, to produce the effect of walking; with two hands, to produce effects too numerous to mention. So that it is surely not childish to use two lanterns to produce effects of dissolving views and rolling curtains; of the rising moon and the setting sun; of the flashing aurora borealis and the evanescent rainbow; of goblins rising from the magician's cauldron; of dancing skeletons and gliding ghosts; of hovering angels and visions in the air; of illuminated buildings and sunlit clouds; of the fairy fountain and rippling waters; of the gentle fall of snow, and the lightning's quick flash; and countless others, some invented, but far more yet to be invented.

The highest skill of the transparency artist is brought out in designing and painting the slides which produce such illusions; some are comparatively easy to paint, some are difficult and others require special frames and mechanical arrangements to assist in their production. *(To be continued.)*

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Screens.

By H. M. Underhill.

PERHAPS my experience may be of some use in the discussion on screens now going on in your Journal. I have had the pleasure of seeing my pictures on what I consider the *beau ideal* of a screen—a freshly-whitewashed plaster-wall. Such a screen can seldom be had, and I generally use a sheet of good calico. If this were quite opaque it would be much better, as so many correspondents say; but I do not think that enough emphasis has been laid on the desirability of having the screen perfectly flat and taut.

I have seen three or four good lantern shows spoilt (as I consider) by the use of loosely-hung sheets. Folds and creases spoil the sharpness of the focus, and distort the picture. I, therefore, made a point of having my screens strained perfectly taut.

My first screen was 7ft. 6in. square, and laced into a wooden frame made with eight mop-handles. The frame took to pieces, and packed into not a very large bag. This is practically the same construction of screen as that described by the vice-president of the Lantern Society on page 157, and I only mention it to explain that I have abandoned it for something which I consider much better, because it is more portable and less trouble to put up. This is a rope frame. I use thin and light, but strong cords. The sheet is 12ft. square, and the frame about 14ft. square; but the size of the frame varies a little, according to the size and shape of the room in which it is hung, knots in it being easily tied or untied, and the length of the sides altered to suit the room. The rope frame has a stout brass ring at each corner; two staples are screwed into beams in the ceiling, and two into the floor, and the frame strained tight to these by means of ropes hooked into the corner rings. The holes made by the staples are so trifling that I find folks do not object to having their ceilings and floors bored. The sheet is attached permanently to the rope-frame, the top and one side of it having a broad gusset through which the ropes run. The other side and the bottom have stout brass eyelet-holes let in them 18in. apart, and are laced to the other two sides of the frame after the frame has been pulled tight. There is also an eyelet at each corner of the sheet, by means of which the corners are stretched out by short cords to the brass rings of the frame. The cords belonging to the two top corners are fastened permanently.

Those for the two bottom corners are adjustable. The lacing is loosened (but it is hardly necessary to remove it) when the screen is taken down, and the screen can be pulled taut without the least difficulty by just lacing it up tight. This screen—myself and one to help—can be put up anywhere in half-an-hour. It packs into a small box, and is not at all heavy. If I could only make it more opaque I should consider it the perfection of a movable screen. No doubt a coat of white-wash, as Mr. Field describes, would make it opaque, but I think it would make a nasty mess of it too.

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Stereoscopic Effects with the Optical Lantern.

By Oscar S. Teale.

(Continued from page 157.)

THIS statement would seem to substantiate my theory of limited point of view, and, strange as it may seem, is followed up in the same article, indeed, in the very next paragraph, with a statement quite incongruous. It says: "It was Mr. D'Almeida, a French physicist, who, toward the same epoch [1858] solved the problem in a most admirable manner, and we cannot explain why his process (that required no special apparatus) fell into desuetude, from which Mr. Molteni has just rescued it, and obtained much success." Then follows a description of the method, which is of projecting the pictures from one lantern through a screen of green glass, and from the other through one of red glass, registering the two pictures as accurately as possible on the screen, then by the use of an ingenious contrivance, the invention of Mr. D'Almeida, consisting of a pair of spectacles, the glasses of which are of the same colours as the screen through which the pictures are projected, the claim being made that the colours employed being complementary, the combined result on the screen is a "lightly tinted white, only the illumination is less brilliant." This we will grant, but the success of this process, judging from the article referred to, was indeed limited to a few persons, as in all other similar experiments.

The most probable reason for its falling into disuse (though unexplainable by the writer of the article in *La Nature*) was the fact that the system was not a success with the large majority of the audience, they not being able to see the true relief that was enjoyed by the few, the reason being because there is but one line of horizon to the picture, while the position of each row of persons seated in the exhibition room, parallel with the plane of the picture is such, if the floor be of the amphitheatre form, as to produce separate horizons for each, possibly not one, and certainly no two, agreeing with the horizon of the picture.

Another reason of the failure is, the lateral position of each person in the same line or row of seats differs, only two or three occupying a position at all approaching the true point of sight of the picture, or the direct line of vision, the perspective becoming more and more distorted as the observers' position is removed from the mein or common perspective centre.

The system of using coloured-glass screens has recently been revived by one Dr. E. Schobbens, of Antwerp, who, it appears at this late day, according to an article published a short time since in the *Photographic Times*, is laying claim to the invention.

From the foregoing consideration of the subject it would seem that the possibilities of producing true stereoscopic effects with the optical lantern are just precisely the same as with any other instrument or method; and that the same conditions must be observed and principles applied. Unless some method is discovered by which the laws of nature may be reversed, we may no more expect or hope for a method or combination which will produce the same perspective effect on the mind of each individual member of an assembled audience, regardless of their respective positions, than we may the discovery of the much coveted and sought after perpetual motion.

The following deductions must then follow as the result of our investigation :—

Stereoscopic effects can be produced with the optical lantern, but only under certain fixed conditions, viz. :—

(1) The proper distance of observation or "point of station" must be regarded, or in other words the "focus" properly adjusted.

(2) The eye must rest on a level with the correct "horizon" of the picture, which, while approximately the same in all pictures taken with a lens, is vastly different in line drawings, paintings, or other pictures produced by hand.

(3) The "point of sight" must be recognised, the eye must rest on the horizon at the proper point, laterally considered, which is the intersection with the horizon of a direct line from the eye, or a line at right angles, or 90deg. with the plane of the picture or screen; the true perspective cannot be seen from a point either to the right or to the left.

(4) The screen must be placed at such an angle as to present its full surface on a plane exactly parallel with the axis of the eyes, vertically as well as horizontally.

(5) For full relief the pictures must be stereoscopic —*i.e.*, taken with a stereoscopic camera, that the proper perspective belonging to each eye may be preserved, and when projected upon the screen the registering as to horizon and centering must be as accurately done as in the case of mounting the finished print for the stereoscope. The precise method of registering I do not pretend in this paper to dictate, whether accomplished by D'Almeida's system or by a system possibly yet to be invented.

(6) True perspective relief and approximate true perspective relief can only be witnessed by a comparatively few individuals at one and the same time—viz., those in the immediate vicinity of the "point of station" or point of observation.

——:o:——

IN the hands of some London photographers, isochromatic plates have given very satisfactory results in the production of cloud negatives.—*W. H. Harrison.*

I HAVE exposed plates on board ship, and found upon development that a reversed action was set up. This I attributed to the action of saline matter in the atmosphere; but I eventually found that this tendency was obviated by soaking the films before development in a bath of lithium carbonate.—*A. L. Henderson.*

Lantern Slide Making by the Wet Plate Process.

By A. P. Higgins.

It is by this process that the great professional manufacturers of lantern slides produce all their beautiful transparencies, and the results in the market speak for themselves as to the value of the process. With wet plates one obtains rapidity combined with the utmost clearness and transparency of the high lights, the finest deposit of silver, and the greatest variety of tones. Experience has shown that, when care is taken in the production, and a reliable toning agent employed, the results may be considered permanent. The process, as discovered by Archer some forty years ago, is briefly as follows :—

A plate is coated with collodion containing in solution iodides and sometimes bromides. This is allowed to set, and is then immersed in a solution of nitrate of silver exposed and developed with sulphate of iron. As in nearly every other branch of photography everything depends upon system and cleanliness; the glass should be by preference patent plate, or flatted crown, and must be very perfectly cleaned, for which purpose either of the following formulæ may be used :

Ammonia ·880	1 oz.
French chalk	3 drachms.
Tripoli powder	2 „
or Methylated spirit	4 ounces.
Nitric acid	1 drachm.

After thoroughly cleaning on both sides, the plate should be polished, and is then ready for collodionising. Some people prefer to use a substratum of albumen, as there is no danger of the film slipping, and the cleaning need not be so perfect, but there is a danger of contaminating the bath when it is employed, besides adding another film to the high lights of the slide, which must, of course, be as clear as possible. There are many varieties of collodion, differing as the pyroxyline from which they have been prepared.

The following is a good formula :—

Sulphuric acid (commercial) ...	6 ozs.
Dried potassium nitrate (pure) ...	3 ozs.
Water	1 „
Prepared cotton-wool	60 grs.

The cotton-wool should be of the quality known as absorbent cotton-wool, which has been freed from grease by steam under high pressure. It is also known as Strutt's cotton-wool for dentists. Should this be unattainable, ordinary cotton-wool may be prepared by boiling in a strong solution of carbonate of soda, well washing and carefully drying.

Mix the acid and water in a porcelain vessel, and add the nitrate previously dried and powdered by heating to 250° F. on the metal plate. The cotton-wool should be made up into little balls, and immersed separately with a glass rod, keeping the temperature at about 150° F. A plate or glass is put over the top of the jar to prevent access of air, and the emission of the dense brownish red fumes. The cotton-wool should be left in for ten minutes, and then, having been taken out, as much as possible of the acid removed by pressure between pieces of glass. It is then immediately placed in a large vessel of water, and very thoroughly washed for twenty-four hours. It is then dried in the sun or over a water bath. Should the cotton-wool dissolve in the acid, add less water, or, if this is not the cause, the temperature may have been allowed to fall below 150° F. The plain collodion is now with—

Alcohol	2½ ozs.
Sulphuric ether	5 „
Pyroxyline, as above	50 grs.

This when dissolved is allowed to stand and deposit any insoluble matter. The clear supernatant liquid is now iodised by the addition of iodides and bromides, as :—

Ammonium iodide	4 grs.
Cadmium bromide	1½ „
Plain collodion	1 oz.

It will be ready for use within a day or two of mixing.

The next thing is to prepare the sensitising bath. A good formula is—

Nitrate of silver	½ oz.
Distilled water	6 ozs.
Potassium iodide	¾ grs.

Take 1½ ozs. of the water, and dissolve the silver in it, and add the iodide. Shake well, and then add the remaining water; filter and test for acidity. Should the bath be very acid, add carbonate of soda to produce a precipitate, and then render slightly acid with pure nitric acid. Some prefer not to add iodide to the bath, but to collodionise a plate, and let it remain several hours in the bath, so as to allow the solution to absorb some of the silver iodide from it, but I think the above will be found preferable.

The plate, after being polished and collodionised, is immersed in the bath with one steady motion, as, if there is the least pause during its descent into the solution, a line will be subsequently formed across the plate in that particular spot. After the plate has been in the bath about half a minute, it should be moved gently up and down in the solution to assist the even formation of the silver salts in the film, and at the end of three minutes, if on removing the plate the surface looks smooth and creamy, and the solution does not run in lines and streaks, the sensitising will be complete, and, after draining the plate, is ready for use. Development may be effected with acid solutions either of iron or pyrogallic acid.

The following are excellent formulæ :—

Ammonia sulphate of iron ...	23 grs.
Glacial acetic acid	25 minims.
Water	1 oz.
Alcohol	quant. suf.
No. 2.—Pyrogallic acid	3 grs.
Citric acid...	1 gr.
Water	1 oz.

No. 3.—Mr. J. S. Pollitt's developer—

A.

Sulphuric acid	1 oz.
Water	3 ozs.

When cold, add—

Nelson's gelatine	1 oz.

Leave this for twenty-four hours at a temperature of 100° F., and then add an excess of iron filings. Allow to stand several days, and add—

Acetate of soda	30 grs.
Water	15 oz.

Filter and bottle for use. It keeps indefinitely.

B.

Sulphate of iron	1 oz.
Glacial acetic acid	4 drachms.
Water	30 ozs.

To develop, take sufficient of B to cover the plate, and add a few drops of A, more or less according to the amount of vigour required. Should the image flash out, the developer should be poured off, and the plate exposed to the action of the air until the image is complete. Wash well, and fix with cyanide of potassium. The above is a developer much recommended by Mr. Chadwick, who says that, though somewhat slow in action, the resulting deposit is very fine, and that it is capable of giving the very best results that can be obtained. It is as well to expose fully, and so develop fairly quickly.

If, after fixing, the plate lacks density, it may be intensified by flooding it with a solution composed of—

Pyro	3 grs.
Glacial acetic acid	1 drachm.
Water	1 oz.

to which is added a few drops of a 30-grain solution of nitrate of silver. Wet plate transparencies may be toned by flooding them with a weak solution of chloride of gold and chloride of potassium, but most people prefer bi-chloride of platinum, which must be neutralised, first with carbonate of potassium, and then rendered slightly acid with nitric acid.

Journal of the Photographic Society of India.

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Practical Hints to Unpractised Lecturers.

— By A. A. Wood.* —

As many persons who are comparatively unpractised as lecturers, or who have had no experience in illustrating their lectures by the aid of dissolving views, are often called upon to contribute to the amusement and instruction of others in this way, a few practical hints on the preparation and delivery of such lectures may be found serviceable.

Selection of Subjects.—In deciding on the subject of the lecture, some consideration must be given to the kind of audience for whom it is intended, so that it may be of a character likely to be understood and appreciated. It may be accepted as an axiom that the audiences who usually attend such lectures come to be *interested* and amused, and lectures that are not calculated to attain these objects end most frequently in failure. The lecturer in such cases usually depresses the audience, and he in turn is depressed by their want of sympathy and lack of attention. Select *instructive* subjects, but never let them fail to be *interesting* as well.

Preparation of the Lecture.—Having selected a subject, the preparation of the lecture is the next thing to be done. Lecturers who have gained self-confidence and fluency of speech are sometimes apt to depreciate preparation. It may be true that their impromptu addresses are clever and even successful, but such lectures are too often shallow. Great success in lecturing is usually achieved by the lecturer who has acquired a thorough acquaintance with the subject to be explained, for it is impossible for one person to impart such instruction on a given subject to another if he himself possess only a superficial knowledge of the same.

Arrangement of Material of Lecture.—The lecture should be arranged progressively, that is to say, it should not be discursive or rambling, but each point should be thoroughly explained before proceeding to the next, and so on till the lecture is concluded. The lecturer should not take for granted that the audience will understand a thing without he gives suitable explanation. Long and difficult words should be avoided as much as possible; language natural and simple is more effective. Before commencing the lecture proper, it will be found desirable to make a few introductory remarks concerning the subject of the lecture, so that the audience may have something from which to form an idea what it is to be about. The interest in the lecture will be most materially enhanced by interspersing it with illustrative anecdotes, poetical quotations, passing references to events, or circumstances of the day. They tend to please the audience and re-assure the lecturer.

Spoken or Read Lecture.—The most effective lectures are those spoken, and not read, for there is a freshness and vigour in their delivery which always awaken sympathy in the audience. In order that lectures thus delivered may not be discursive, the preparation of notes which give the heads of the discourse and such things as may slip the memory when most needed (figures, quotations, &c.), is strongly advised. Persons who feel it necessary to read their lecture should practise reading it aloud several times before the night on which it is to be delivered, that they may familiarise themselves with the formation of the sentences and the order in which the subject is dealt with.

Management of the Voice.—As one of the principal objects of every speaker is to be effectively and easily heard by those who listen to him, it is essential the voice should be carefully managed. To suppose that a person is better heard because of his loud speaking is a great error, for such is not only disagreeable in itself, but extremely inconvenient to the lecturer and also to the audience.

When the natural power of the voice in ordinary conversation is not sufficient, extend that tone by giving it a force and volume proportioned either to the place you wish to fill, or to the distance of those whom you address, but preserve the usual key of the natural tone. By not exceeding its limit, the voice may at pleasure be modulated, and will be under perfect control, and not become mere vociferations.

The lecture should be addressed to the most distant person in the audience.

The Season and Time for Lectures.—The best season for these lectures are the dark months of the year, from October to April. The time for commencing the lecture depends very much upon local circumstances, but about 7.30 or 8 p.m. are usually found to be the best times, and the lecturer should not, except under the most extraordinary circumstances, exceed two hours in delivery.

The best day of the week on which the lecture should be delivered depends on local circumstances, but in districts where there is a large working population Saturday evenings are strongly to be recommended.

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* See Editorial Table.

Prices of admission should be arranged according to the class of audience expected, and it is usually found more profitable to make a small charge rather than to have free admission and take a collection.

A very good way to make a lecture known is to distribute tickets of admission and receive payment for them at the doors on the evening. It should be always remembered that more is accomplished by personal efforts to secure a good attendance than by expensive advertisements.

THE ARRANGEMENT OF SLIDES.—This part of the work should always be performed by the lecturer himself, and not left to the exhibitor. The lecturer, being thoroughly familiar with the subject, is less likely to make a mistake in the arrangement than one who is probably quite unacquainted with the manner in which the lecturer intends to treat the subject. The vexation, both to the audience and the lecturer, when the slides do not come in their right order, and the little chance there is of rectifying an error in the dark, form strong arguments why the lecturer should do the work of arrangement himself.

CAUTION.—If any difficulty should occur with the lecturer, slides, or apparatus, every sacrifice should be made to prevent the audience becoming aware of it. Inexperienced lecturers absurdly commence by making apologies. They have a bad cold, or nearly missed their train; the slides are not right; or even broadly hint that the operator is inefficient. A lecturer should remember that when he undertakes to give a lecture, *he* is responsible for its success or failure; these confidences, either before or during the lecture, do not excuse him, and invariably make the audience hypercritical.

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Society Meetings.

BRECHIN PHOTOGRAPHIC ASSOCIATION.—The annual lantern exhibition was held in the City Hall, on Oct. 21. The hall was crowded to excess. The first part consisted of the lecture set, "A Thousand Miles Up the Nile," followed by a selection of the members' own work and dissolving effect slides. Mr. William Shaw Adamson, the president, occupied the chair, and Mr. A. R. McLean Murray, F.E.I.S., gave the descriptive lecture in a manner which left nothing to be desired. The lantern was under the charge of Messrs. Dakers and Innes. The admission was by free ticket, and a collection was taken at the door, amounting to £9 7s. 6d. This has been the most successful exhibition given by this society. Great interest is taken in its work by the townspeople, of whom about one-tenth witnessed this exhibition.

CAMERA CLUB.—The first technical meeting of the winter session took place on Oct. 8, and Captain Abney read a paper entitled "On Light and Lights." Mr. Stroh occupied the chair. Previous to the lecture, the hon. sec. handed round some examples of coloured photographs, lent for exhibition by the Art Colour Photograph Company. In these the paper print is rendered translucent, and the colouring is done roughly from the back. On Oct. 12 a lantern exhibition was held. Slides were shown by Messrs. Ferrers, Matthews, Fitz-Payne, Chang, Bridger, Barton, Aby, Dr. Patterson, and Major Tagart and Lysaght. On Oct. 26 lantern slides were shown, and on Oct. 29 Dr. Patterson read a paper entitled "Animal Photography with a Hand Camera." This was illustrated with lantern slides. Monday, Nov. 2, 8.30 p.m., smoking concert. Offers of assistance will be welcome. Thursday, Nov. 5, 8.30 p.m., Dr. J. J. Acworth, "The Action of Light and Heat on the Haloid Silver Salts." Monday, Nov. 9, 8.30 p.m., elementary lecture, No. 2, lenses ii., Mr. Lyonel Clark. Thursday, Nov. 12, 8.30 p.m., Mr. G. L. Addenbrooke, "Aluminium and its Application to Photography."

HACKNEY PHOTOGRAPHIC SOCIETY.—The ordinary meeting, was held on the 1st inst., the president being in the chair. Messrs. W. P. Wands and Augustus W. Wilson were nominated for membership. Being an evening set apart for the exhibition of members' lantern slides, a number of ladies were present.

LANTERN SOCIETY.—On the 26th ult., at an informal meeting, Mr. Stocks exhibited his new lamp. This was tested against two others; but the greater intensity of the former was at once apparent. Mr. J. Hay Taylor, Editor of *Optical Magic Lantern Journal*, showed and explained a lecturer's new folding reading-lamp (invented by Chadwick) and Suter's new gauge and regulator. Numerous slides were projected by Commander Gladstone, hon. sec.

LEEDS PHOTOGRAPHIC SOCIETY.—The monthly meeting was held on the 1st Oct., in the Mechanics' Institution, the President, Mr. Godfrey Bingley, in the chair; when Mr. H. M. Smith attended and delivered a lecture with lime-light illustrations on "Film and Kodak negatives and lantern transparencies therefrom." The majority of the pictures shown were instantaneous exposures, and in this respect possess not only technical but artistic merit.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.—The eighth ordinary meeting of the 28th session was held in the Lancashire and Yorkshire Railway Companies Sale-room, Titheburn Street, on Thursday, the 24th September, 1891. The President, Mr. Paul Lange, in the chair. The occasion was regarded as one of special interest, as being the inauguration of the winter season. The hall was crowded in every part by an audience of some seven hundred persons, and there were a considerable number of ladies present. At the conclusion of the preliminary business, Mr. George E. Thompson, president of the Birkenhead Photographic Association, gave a lecture on "The Stone Age of the Passion Play at the Italian Lakes."

NORTH MIDDLESEX PHOTOGRAPHIC SOCIETY, Jubilee House, Hornsey Road, N.—On Monday, Oct. 12, 1891, Mr. J. C. S. Mummery in the chair, Mr. Roland Whiting delivered to an audience of fifty members and friends a most interesting and exhaustive lecture on the subject of intensification and reduction of gelatine negatives.

IN connection with the S. Mary Abbot's Branch of the C.E.T.S., the Rev. J. Grant Mills, hon. sec. of the United Committee for the Prevention of the Demoralisation of Native Races by the Liquor Traffic, gave a very interesting lecture, on 21st Sept., in the Kensington Town Hall. The Rev. G. S. Pownall presided. The lime-light dissolving views took us to Sierra Leone, Madagascar, Bechuanaland, Morocco, Egypt, India, and North-West America, &c. In sad sequence there fell on the picture-sheet martyred Bishop Hannington and the new native god, a huge monument of empty gin bottles, the liquor being sold at 2s. 6d. a dozen, or 2½d. a bottle of "superior gin," and a French spirit so cheap as 9d. a gallon. A specimen of a handkerchief advertising different ales and stouts was also exhibited, showing to what depths commerce in this traffic can sink in this enlightened country.

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Editorial Table.

LANTERN SLIDE PRINTING FRAME.—From Messrs. A. R. Wormald and Co., of Sutton, we have received one of their new printing frames, by which lantern slides can readily be made from any part of a negative, and in any position, from any sized negatives up to whole plate. This apparatus will be found to be particularly convenient for the purpose.

"LANTERNS: HOW MADE AND USED" is the name of an interesting book by Mr. A. A. Wood, 74, Cheapside, E.C. This work has now reached its fourth edition. Numerous additions have been made to the previous edition which renders it "up to date." It is written in an easy and fluent style, and cannot fail to be of great interest and use to those interested in lanterns. On page 173 we reproduce a chapter on "Practical Hints to Unpractised Lecturers." The price is one shilling, and our readers will find their money well invested by sending for this book.

ECLIPSE CARRIER.—Since we reviewed this carrier, Mr. W. I. Chadwick has made alterations which enhance its value. A pocket is now provided which precludes all possibility of a slide falling out, which is often the case with open-end carriers.

COLOURED MATS.—Messrs. C. C. Vevers have sent us a sample box of coloured mats for lantern slides. These are in a variety of colours and shapes, and are put up in boxes of 100 for 6d.

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A SCARE AT HAVERSTOCK HILL.—During a lantern entertainment at Oxenden Presbyterian Church, Haverstock Hill, N.W., on 15th ult., the audience received a "scare." The light at the lantern suddenly went out, leaving the audience in darkness, whilst in the vicinity of the lantern loud noises were heard. It was supposed that the lantern, &c., had been turned over. A general rush ensued, which, after calls of "No danger," and "Keep your seats," was eventually quieted by the exertions of the officers in charge. After a time the gas was turned up, and instead of a general wreck of the lantern apparatus, it was found that the gas-bags and weights, which had been erected on the top of the seats, had turned over, and the loud noises spoken of were merely the heavy pressure weights falling first on a seat, and then on the floor. The lantern operator remained cool and collected (as lantern operators should), and it was probably owing to this that those near the apparatus did not create a stampede.

Correspondence.

THE PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

[*To the Editor.*]

SIR,—I shall feel obliged if you will kindly announce in the columns of the *Optical Lantern Journal* that the council of the Photographic Society of Great Britain have, with their customary kindness to us, allowed the exhibition of their society at the Gallery of the Royal Society of Painters in Water Colors, 5A, Pall Mall East, S.W., to be used for the benefit of this association, on the evening of Friday, the 6th November.

There will be an exhibition of lantern slides at 8.45 p.m., when specially selected slides will be shown. Doors open at seven. Tickets of admission, price sixpence, can be obtained from the attendants at the gallery, or from—Yours faithfully, H. J. BEASLEY, hon. sec.

65, Chancery-lane, W.C., 27th October, 1891.

CLOUDS ON LANTERN COVER GLASSES.

[*To the Editor.*]

SIR,—You, or someone in your Journal, suggested some time ago that it was a good idea to print clouds on the covers of lantern slides. I wish to procure a number. Can you inform me where I can get them? I have asked at many places, but they all say they never heard of them. Where can I obtain them?—Yours, &c., EXPERIMENTER.

[Can some reader supply the information required?—ED.]

CLICK IN BEARD'S REGULATOR.

[*To the Editor.*]

SIR,—I have noticed in the above regulator that if the gas is turned off at jets and on at the bottle a sharp metallic click is heard. Can you tell me what causes it? I have carefully considered the sketch you published of it, but cannot find the cause, and am loth to undo the bellows part of mine.—Yours, &c., L. P. D.

[Perhaps Mr. R. R. Beard will inform our correspondent about this matter.—ED.]

LECTURES FOR SOCIETIES.

[*To the Editor.*]

DEAR SIR,—I think it my duty to inform hon. secretaries of the photographic societies of the United Kingdom, who are making their arrangements for lantern slide exhibitions during the coming winter, that the Boston Camera Club, U.S.A., have sent us another lecture entitled "The Yosemite Valley," prepared by members of the California Camera Club.

This is a gift to us in trust for the amateur photographic societies of Great Britain, on the same terms as "Illustrated Boston," the "White Mountains of New Hampshire," and "In and about Columbus."

There are now four complete lecture sets of about eighty slides, each with accompanying lecture, neatly mounted in type of American scenery, in free circulation among photographic societies in this country, and which can be lent on application to me.

The only conditions are that the carriage of the boxes be paid at least one way; that an account of the lectures and press notices of the same be posted by secretaries at once to Wm. Garrison Reed, 25, Kilby-street, Boston, U.S.A. (the manager of the Interchange of Illustrated Subjects), and that the greatest care be taken of the slides; any accidents to which, as far as possible, to be made good, and the same reported to me immediately.—Yours truly,

G. M. TUNSTALL, Hon. Sec.

Liverpool Amateur Photographic Association,
3, Lord-street.

Notes and Queries

Mat asks: Who invented a mat for lantern slides, the one side of which was black and the other white? What advantage has this over both sides being the same colour? *Answer.*—We believe Mr. Pumphrey, of Birmingham, was the first to introduce the mat you speak of. (2) The operator can see at a glance which is the correct side of the picture to place next the condenser.

Cautious.—We cannot recommend any of the "safety valves" you mention. Sufficient pressure of gas is the only safeguard.

Ed Summers.—The cause of the deterioration of the oxygen in the gas-bag is probably the naphtha vapour which is given off. If the bag is a new one, fill it with air, and after standing for a time empty and refill. Do this several times until the naphtha smell has disappeared.

W. N. Wells.—We wish you success in your undertaking. You will find Mr. Beard's address in our advertising pages; the other addresses are Brin's Oxygen Co., Horseferry-road, Westminster, and H. Clarkson, Bartlett's Buildings, Holborn, E.C.

C. Wright, Junr.—We hope you got what you required from the particulars we sent you on the 4th ult.

F. J. B.—The particular gauge mentioned can be used for either oxygen or hydrogen without fear of explosion.

De Mendlie Hall.—(1) The method you suggest of having three or four jets to play on one lime, will give a greatly increased light; a piece of lime, with a flat side about the size of a penny, would probably be the best form. (2) The limit to the size which a photograph can be shown is governed by the size of screen obtainable, the power of the light and the space at command.

A. C. M. writes: "I shall be glad if you will give me *formulæ* for preparing and sensitising Whatman's drawing paper, so that in a dry state I can enlarge from a 3-in. negative to 30-in. in diameter, also the normal time of exposure with a three-wick lantern." *Answer.*—The paper could be coated with a gelatine bromide emulsion, but this will at once destroy the rough surface which is its special feature. It can be salted with bromide of potassium and sensitised with nitrate of silver, but a solar camera must be employed and the print developed. If, however, it is salted with chloride of ammonium and sensitised with nitrate of silver, the image can be printed out in the sun, but the lantern would not answer.

Condenser says: "Can you explain why the edges of disc are not illuminated properly, when condensers of short focus are used—say, 1½in. or 2in. focus? Is it on account of them not being fixed in their cells at the proper distance apart from each other? I think, as a rule, they are mounted farther apart from each other than the ordinary 2½in. condenser; but I should have thought that they should be closer. *Reply.*—The cause of the edges of disc not being properly illuminated is that the diameter of condenser is too great in comparison to its focus.

R. L. M.—Thanks for your suggestion.

W. B.—Never mind "not being used to writing for the Press." If you will send us all the particulars, we will see that it is put into proper shape.

Jas. Roberts.—We are sorry we cannot devote space to show you how to make a model of "a ship rolling on an artificial sea."

J. Chapman.—Your letter was directed and forwarded to the party desired.

M. G.—Replied per post. We shall be glad to assist you if you will call by appointment.

Lime writes: "Some time ago I saw a statement that in America the limes were set between claws, like a lamp-chimney. Do you think this is a better way than placing them on a pin, as in the country?" *Answer.*—Yes.

Gourdnam inquires: "What would be the result if a bottle of compressed gas were dropped from a great height?" *Reply.*—A good deal would depend upon the nature of the substance upon which it fell; but if the ground was very hard, and the fall great, we can only say that we would prefer being some distance off.

Enlarger asks: "Is Hume's enlarging lantern a good apparatus for making bromide enlargements, and is the light a good one? I hear it is an ordinary house lamp." *Answer.*—We have never tried this apparatus. Why not write for particulars to Mr. Hume?

Vicar.—(1) Dissolve the aniline dye in alcohol. (2) We never heard of such an apparatus as you mention.

W. B.—The lamp is an excellent one.

H.—Reply per post.

—:o:—

Selections.

THE simplest of all processes for the production of lantern slides is that of printing the image out on gelatino-chloro-citrate, and toning and fixing as for a paper print.—*A. P. Higgins.*

⁂

IT is possible to produce a good transparency from a negative which will not yield a good print; but only those who are thoroughly experienced can obtain such.—*Dr. L. M. Moir.*

⁂

VERY few lantern slides look well in circular mats, but many amateurs use this shape as a means of covering up corners of the slide which have been caused by careless manipulation. This is particularly the case with wet collodion work; but with the dry plates of the present day everything should be quite perfect up to the extreme corners.—*F. J. S.*

⁂

BY binding a lantern slide with white paper, a full account of it can, if necessary, be written upon it, and can be easily read at the time of exhibiting.—*T. E. Heath.*

⁂

WHEN using pyro developer, one is very apt to get the fingers stained a brown colour. This may, however, be removed by washing the stained parts first in a solution of chloride of lime, and afterwards in a weak solution of citric acid.—*W. Jackson, jun.*

⁂

NO bromide print or platinotype will get as much out of a negative as will printing out.—*W. D. Richman.*

⁂

HAVING produced a good small negative which pleases the sitter, it is a very easy matter, by using a very little business tact, to sell your customer a good artistically-enlarged picture from the same negative.—*G. D. Milburn.*

⁂

ANYONE of moderate intelligence who cares for any subject whatever, can, by help of a lantern, enable a great many others to share his interests.—*T. C. Horsfall.*

⁂

THE great advantage of the rolling curtain effect is that between each slide, the screen having been made black for a few seconds by the curtain rolling down, the eyes are relieved from the great glare, and each picture, all through the entertainment, comes as fresh and bright, and with equal effect to the eyes of the spectators as the first slide exhibited.—*A. A. Wood.*